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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/617,033	07/11/2003	Taku Amada	240200US2	2698
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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			PHAM, HAI CHI	
			ART UNIT	PAPER NUMBER
			2861	

DATE MAILED: 03/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/617,033

Applicant(s)

AMADA ET AL.

Examiner

Hai C. Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18, 26, 28 and 31-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 31-35 is/are allowed.
- 6) ☒ Claim(s) 1, 3, 6-14, 16-18, 26, 28 and 36 is/are rejected.
- 7) ☒ Claim(s) 2, 4, 5 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “*liquid crystal deflecting element array being provided between said scanning unit and said scanned face*” (claims 6 and 36) must be shown or the feature canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because it fails to discuss about the “*liquid crystal deflecting element array being provided between said scanning unit and said scanned face*” as recited in claims 6 and 36. Although there is a brief display of the content of claim 6 with respect to the above-mentioned limitation under the “Summary of the Invention” section, nowhere else in the current disclosure, the Applicants have indicated that the liquid crystal deflecting element array could be provided between the scanning unit (e.g., polygon mirror) and the scanned face as an alternative configuration (e.g., versus the liquid crystal deflecting element array being located between the light source and the polygon mirror.

Appropriate correction is required.

### ***Claim Objections***

3. Claims 15, 28 and 36 are objected to because of the following informalities:

#### Claim 15:

- Line 5, “a scanning unit” should read --said polygon mirror-- to keep the consistency of the claimed terminologies;
- Line 7, “sub-scan directions” should read --sub-scan direction--.

#### Claim 28:

- Lines 5-6, “the plurality of adjusting units is a liquid crystal element” should read -  
- the plurality of adjusting units are liquid crystal elements--.

Claim 36:

- Line 9, "main-scan directions" should read --main-scan direction--;
- Line 10, "sub-scan directions" should read --sub-scan direction--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. The following claims are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6:

- Line 5, "said scanning unit" lacks clear antecedent basis. It is suggested to change "said scanning unit" to --said polygon mirror-- as recited in the parent claim 1.
- The limitation "said liquid crystal deflecting element array being provided between said scanning unit and said scanned face" is clearly incompatible with the following limitation "said liquid crystal deflecting element being provided between a light source and a polygon mirror" recited in the parent claim 1 since there is only one set of the liquid crystal deflecting element array, which cannot be disposed at two different location within the light scanning apparatus.

Claim 11:

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- Line 3, "said scanning unit" lacks clear antecedent basis.

Claim 26:

- The following limitation "at least N-1 of the plurality of adjusting units are liquid crystal elements" appears to override the immediately preceding limitation in "wherein at least one of the plurality of adjusting units is a liquid crystal element [driven by an electric signal]". It is suggested to combine the above two limitations into a single recitation, e.g., --wherein at least N-1 of the plurality of adjusting units are liquid crystal elements driven by an electric signal--.

Claim 28:

- Similarly, the following limitation "the plurality of adjusting units is a liquid crystal element driven by an electric signal" appears to override the immediately preceding limitation in "at least one of the plurality of adjusting units is a liquid crystal element driven by an electric signal". It is suggested to delete the first limitation into a single recitation and to keep only the second limitation, e.g., retain --the plurality of adjusting units *are* liquid crystal elements driven by an electric signal--.

Claim 36:

- Line 11, "said scanning unit" lacks clear antecedent basis.

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 3, 13-14, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli et al. (U.S. 5,461,412) in view of Feinberg (U.S. 5,745,155).

Paoli et al. discloses a light scanning apparatus configured to scan a scanned surface (image plane 32 that may be a rotating photosensitive drum 12) with a light beam (16), comprising a liquid crystal element (light beam deflecting element 22) configured to deflect the light beam to adjust the position of a light spot of said light beam formed on the scanned face, said liquid crystal element being provided between a light source (14) and a polygon mirror (24) (the beam deflecting element 22 disposed between the light source 14 and the polygon mirror 24 can be either an optical prism or a liquid crystal element, which deflects the light beam 16 for adjusting the scan line curvature, e.g., correcting the light beam spots in the sub-scanning direction) (see Abstract and col. 6, lines 34-54).

Paoli et al. fails to teach the light intensity compensating unit.

Feinberg discloses a light scanning apparatus including a scan uniformity correction unit (liquid crystal element 30), which applies an attenuation to offset the variation in intensity of the light beam forming the curved scan line (50, Fig. 3) so as to form the resulting scan line having a uniform intensity (40, Fig. 4).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the device of Paoli et al. with the light intensity compensating unit as taught by Feinberg. The motivation for doing so would have been to eliminate the variation in intensity over each scan line regardless of the variation of the intensity generated by the raster output scanning device as suggested by Feinberg.

The method claim 18 is deemed to be clearly anticipated by functions of the above structures.

8. Claims 1, 3, 7-11, 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli et al. in view of Nakajima et al. (U.S. 5,753,907).

Paoli et al. discloses all the basic limitations of the claimed invention except for the light intensity compensating unit, which includes a detecting unit for detecting the intensity of the light beam and for detecting the scan start timing of the light beam, the light beam shaping aperture, the control of the transmissivity of the adjusting unit.

Nakajima et al. discloses a multiple beam scanning apparatus comprising an adjusting unit that adjusts the scanning line pitch and thus the position of a light spot of said light beam formed on the scanned face, and a compensating unit that compensates the light intensity of said light beam at said scanned face due to change caused by the adjustment of the position of said light spot (col. 3, lines 16-40: the light intensity is compensated while the scanning line pitch is adjusted), a detecting unit (photosensor 34) that detects the intensity of said light beam, wherein said compensating unit controls the radiation intensity of said light source (col. 3, lines 16-



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40), an aperture (27), provided between said light source and said scanning unit (Fig. 1a), that shapes said light beam, wherein said compensating unit displaces said aperture (by rotating the aperture 27), said compensating unit controls a transmissivity adjusting unit provided between said light source and said scanning unit (the aperture 27 adjusts the intensity of the light beam by rotation and thus blocks part of the light beam).

9. Claims 16-17, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli et al. in view of Feinberg, as applied to claims 1 and 13 above, and further in view of Andrews et al. (U.S. 5,493,326).

Paoli et al., as modified by Feinberg, discloses all the basic limitations of the claimed invention except for the liquid crystal device being provided between the polygon mirror and the scanned surface and the tandem-type image forming apparatus.

Andrews et al. discloses an image forming apparatus comprising an optical component formed by liquid crystal that can be disposed either between the light source and the polygon mirror (16) or between the polygon mirror and the photoconductor belt (2) for correcting a curvature or line skew of the scanning lines by applying a variable voltage across the optical component, which can be applied to a either single or multiple ROS stations for producing a color image.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the liquid crystal device for correcting the scan line skew in the device of Paoli et al. as taught by Andrews et al. The motivation for

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doing so would have been to prevent misregistration of the successive color scanning lines.

10. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Paoli et al. in view of Feinberg, as applied to claim 1 above, and further in view of Hayashi et al. (U.S. 6,081,386).

Paoli et al., as modified by Feinberg, discloses all the basic limitations of the claimed invention except for the resin lens provided in the optical path from said light source to said scanned face.

Hayashi et al. teaches using a non-spherical scanning lens made of plastic, which would prevent the non-uniformity in the refraction index of the scanning lens to cause the variation of the scanning line pitch.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a scanning lens made of resin as taught by Hayashi et al. in the device of Paoli et al. The motivation for doing so would have been to suppress eventual variation of the scanning line pitch due to the non-uniformity of the refraction index of the scanning lens as suggested by Hayashi et al.

***Allowable Subject Matter***

11. Claims 26, 28, 31-35 are allowed.

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12. Claims 2, 4-6, 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. Claims 26 and 28 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

14. Claim 6 would be allowable if rewritten to overcome the rejection under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter: the primary reason for the indication of the allowability of claims 2, 15 is the inclusion therein, in combination as currently claimed, of the limitation that the liquid crystal element comprises at least N-1 deflecting units where N is the number of light beams, which is not found taught by the prior art of record considered alone or in combination.

Claims 4-5 are dependent from claim 2 above and are therefore allowable.

### ***Response to Arguments***

16. Applicant's arguments with respect to claims 1, 3, 7-14, 16-18 and 36 have been considered but are moot in view of the new grounds of rejection presented in this Office action.

***Contact Information***

17. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (571) 272-1934. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM  
PRIMARY EXAMINER  
February 25, 2005